



# **Science Standards of Learning**

## ***Teacher Resource Guide***

**Grade Five**

**Commonwealth of Virginia  
Department of Education  
Richmond, Virginia  
2000**

## **Grade Five Science Strand**

### **Scientific Investigation, Reasoning, and Logic**

This strand represents a set of inquiry skills that defines what a student should be able to do when conducting activities and investigations. The various skill categories are described in the “Investigate and Understand” section of the *Standards of Learning*, and the skills in science standard 5.1 represent more specifically what a student should be able to do as a result of science experiences in fifth grade. Across the grade levels the skills in the “Scientific Investigation, Reasoning, and Logic” strand form a near continuous sequence of investigative skills. (Please note Appendix, “Science Skills, Scope, & Sequence.”) It is important that the classroom teacher understands how the skills in standard 5.1 are a key part of this sequence (i. e., K.1, K.2, 1.1, 2.1, 3.1, 4.1, 5.1, 6.1, and 6.2). The fifth grade curriculum should ensure that skills from preceding grades are continuously reinforced and developed. It is also important to note that 25% of items on the 3<sup>rd</sup> and 5<sup>th</sup> grade SOL assessments measure the skills defined in the “Scientific Investigation, Reasoning, and Logic” strand.

## **Strand: Scientific Investigation, Reasoning, and Logic**

### **Standard 5.1**

The student will plan and conduct investigations in which

- appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
- rocks, minerals, and organisms are identified using a classification key;
- data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
- accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
- predictions are made using patterns, and simple graphical data are extrapolated; and
- estimations of length, mass, and volume are made.

### **Understanding the Standard**

The skills in standard 5.1 are intended to define the "investigate" component of all of the other fifth grade standards (5.2 – 5.7). The intent of standard 5.1 is for students to continue to develop a range of inquiry skills and achieve proficiency with those skills in the context of the concepts developed at the fifth grade. Standard 5.1 does not require a discrete unit on scientific investigation because the inquiry skills that make up the standard should be incorporated in all the other fifth grade standards. It is also intended that by developing these skills, students will achieve a greater understanding of scientific inquiry and the nature of science, and will more fully grasp the content-related concepts.

## Standard 5.1

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Systematic investigations require standard measures and consistent and reliable tools. Metric measures are a standard way to make measurements and are recognized around the world.</li><li>• A classification key is an important tool used to help identify objects and organisms. It consists of a branching set of choices organized in levels, with most levels of the key having two choices. Each level provides more specific descriptors, eventually leading to an identification.</li><li>• Systematic investigations require organized reporting of data. The way the data are displayed can make it easier to see important patterns, trends, and relationships. Bar graphs and line graphs are useful tools for reporting discrete data and continuous data, respectively.</li><li>• A scientific prediction is a forecast about what <i>may happen</i> in some future situation. It is based on the</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• select and use the appropriate instruments including centimeter rulers, meter sticks, graduated cylinders, balances, and stopwatches for making basic measurements.</li><li>• measure temperature, distance and dimensions, mass, and volume using metric measures. This includes millimeters, centimeters, meters, kilometers, grams, kilograms, milliliters, liters, and degrees Celsius.</li><li>• use classification keys to identify rocks, minerals, and organisms.</li><li>• collect, record, and report data using charts and tables and translate numerical data into bar or line graphs.</li><li>• make predictions based on trends in data. This requires the recognition of patterns and trends, and determining what those trends may represent.</li><li>• make plausible estimations of length, mass, and volume.</li></ul>

**Standard 5.1 (continued)**

Overview	Essential Knowledge, Skills, and Processes
<p>application of factual information and principles, and recognition of trends and patterns.</p> <ul style="list-style-type: none"><li>• Estimation is a useful tool for making approximate measures and giving general descriptions. In order to make reliable estimates, one must have experience using the particular unit.</li></ul>	

## **Grade Five Science Strand**

### **Force, Motion, and Energy**

The strand “Force, Motion and Energy” focuses on student understanding of what force, motion, and energy are and how the concepts are connected. The major topics developed in this strand include magnetism; types of motion; simple machines; and energy forms and transformations, especially electricity, sound, and light. This strand includes science standards K.3, 1.2, 2.2, 3.2, 4.2, 4.3, 5.2, 5.3, 6.3, and 6.4.

## **Strand: Force, Motion, and Energy**

### **Standard 5.2**

The student will investigate and understand how sound is transmitted and is used as a means of communication. Key concepts include

- frequency, waves, wavelength, resonance, vibration;
- the ability of different media (solids, liquids, gases) to transmit sound; and
- communication tools (voice, Morse code, sonar, animal sounds, musical instruments).

### **Understanding the Standard**

This standard introduces the concept of what sound is and how sound is transmitted. It also focuses on how people use it as a communication tool. The students are introduced to scientific vocabulary and the phenomena of frequency, waves, wavelength, resonance, and vibration in this standard. Students should make predictions and experiment with the transmission of sound and learn that humans and other animals communicate in various ways using sound. It is intended that students will actively develop science investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.

## Standard 5.2

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Sound is a form of energy produced and transmitted by vibrating matter.</li><li>• Sound travels in waves and can be described by the wavelength and frequency of the waves. A wave is a disturbance moving through a medium (solid, liquid, or gas).</li><li>• The frequency of sound is the number of vibrations in a given unit of time.</li><li>• Sound is a compression wave moving outward from its source. The wavelength of sound is the distance between two compressions.</li><li>• Pitch is determined by the frequency of a vibrating object. Objects vibrating faster have a higher pitch than objects vibrating slower.</li><li>• Sound is amplified when it resonates.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• use the basic terminology of sound to describe what sound is, how it is formed, how it affects matter, and how it travels.</li><li>• create and interpret a model or diagram of a compression wave.</li><li>• explain why sound waves travel only where there is matter to transmit them.</li><li>• design an investigation to determine what factors affect the pitch of a vibrating object. This includes vibrating strings, rubber bands, beakers/ bottles of air and water, tubes (as in wind chimes), and other household materials.</li><li>• compare and contrast sound traveling through a solid with sound traveling through the air. Explain how different media (solid, liquid, and gas) will affect the transmission of sound.</li><li>• design a device that resonates, and explain how it works.</li></ul>



### Standard 5.2 (continued)

Overview	Essential Knowledge, Skills, and Processes
<ul style="list-style-type: none"><li>• Sound travels more quickly through solids than through liquids and gases because the molecules of a solid are closer together. Sound travels slowest through gases because the molecules of gases are farthest apart.</li><li>• Some animals make and hear ranges of sound vibrations different than humans can make and hear.</li><li>• Musical instruments vibrate to produce sound.</li></ul>	<ul style="list-style-type: none"><li>• compare and contrast the sounds (voice) that humans make and hear to that of other animals. This includes bats, dogs, and whales.</li><li>• compare and contrast how different kinds of musical instruments make sound. This includes string instruments, woodwinds, percussion instruments, and brass instruments.</li></ul>

## **Strand: Force, Motion, and Energy**

### **Standard 5.3**

The student will investigate and understand basic characteristics of white light. Key concepts include

- the visible spectrum, light waves, reflection, refraction, diffraction, opaque, transparent, translucent;
- optical tools (eyeglasses, lenses, flashlight, camera, kaleidoscope, binoculars, microscope, light boxes, telescope, prism, spectroscope, mirrors); and
- historical contributions in understanding light.

### **Understanding the Standard**

Concepts related to light are introduced at the fifth grade level. Standard 5.3 focuses on the characteristics of white light, tools that aid in the production and use of light, and the historical contributions of inventors and scientists. Instruction should center on the basic science concerning light energy and how we use light in our daily lives. A related science standard is 4.2, which focuses on forms of energy and provides a foundation for understanding that light is energy. The use of a microscope is applied to the study of plants, animals, and cells (5.5). It is intended that students will actively develop science investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.

### Standard 5.3

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• The white light that we see is really a combination of several different wavelengths of light traveling together. These wavelengths are represented by the colors red, orange, yellow, green, blue, indigo, and violet.</li><li>• Light waves are characterized by their wavelengths. In the visible spectrum, red has the longest wavelength, and violet has the shortest.</li><li>• Light travels in waves. Compared to sound, light travels extremely fast. It takes light from the sun less than eight and a half minutes to travel 150 million kilometers to reach the Earth.</li><li>• Unlike sound, light waves travel in straight paths called rays and do not need a medium through which to move.</li><li>• Light travels in straight paths until it hits an object, where it either bounces off (is reflected); is bent (is refracted); passes through the object (is transmitted); or is absorbed as heat.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• explain the relationships between wavelength and the color of light. Name the colors of the visible spectrum.</li><li>• diagram and label a representation of a light wave (wavelength, peak, trough).</li><li>• compare and contrast reflection and refraction.</li><li>• design an investigation to determine what happens to light as it passes through a convex lens. Describe the results.</li><li>• design an investigation to determine what happens to light as it passes through a concave lens. Describe the results.</li><li>• identify some common optical tools, and describe whether each has lenses, mirrors, and/or prisms in it. These should include eyeglasses, flashlights, cameras, binoculars, and microscopes.</li><li>• explain the terms transparent, translucent, and opaque, and give an example of each.</li></ul>

### Standard 5.3 (continued)

Overview	Essential Knowledge, Skills, and Processes
<ul style="list-style-type: none"><li>• The relative terms transparent, translucent, and opaque indicate the amount of light that passes through an object.</li><li>• Lenses and mirrors are used in many optical tools to enlarge or clarify an image.</li><li>• A prism can be used to refract white light. When the different wavelengths of light in white light pass through a prism, they are bent at different angles. The colors of light we see are red, orange, yellow, green, blue, indigo, and violet.</li><li>• Inventors and scientists have used the properties of lenses and mirrors to create important optical tools. These tools, including the refracting telescope, the microscope, and the reflecting telescope, have led to important scientific discoveries.</li></ul>	<ul style="list-style-type: none"><li>• analyze the effects of a prism on white light and describe why this occurs. Explain why a rainbow occurs.</li><li>• describe the contributions of Galileo Galilei, Robert Hook, Anton van Leeuwenhoek, and Isaac Newton in creating and using optical tools.</li></ul>

## **Grade Five Science Strand**

### **Matter**

The strand focuses on the description, physical properties, and basic structure of matter. The major topics developed in this strand include concepts related to basic description of objects; solids, liquids, and gases (especially water); phase changes; mass and volume; and the structure of classification of matter. This strand includes science standards K.4, K.5, 1.3, 2.3, 3.3, 5.4, 6.5, 6.6, and 6.7.

## **Strand: Matter**

### **Standard 5.4**

The student will investigate and understand that matter is anything that has mass; takes up space; and occurs as a solid, liquid, or gas. Key concepts include

- atoms, molecules, elements, and compounds;
- mixtures and solutions; and
- effect of temperature on the states of matter.

### **Understanding the Standard**

This standard incorporates various characteristics of matter such as mass, volume, and the effect of heat on the three states of matter. Instruction should center on the basic structure of matter and how it behaves. This standard builds on standard 3.3, which provides a basis for understanding the structure of matter. It is intended that students will actively develop science investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.

## Standard 5.4

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• All matter –regardless of its size, shape, or color – is made of particles (atoms and molecules) that are too small to be seen with the unaided eye.</li><li>• There are over 100 known elements that make up all matter. The smallest part of an element is an atom.</li><li>• When two or more elements combine to form a new substance, it is called a compound. There are many different types of compounds, because atoms of elements combine in many different ways (and in different whole number ratios) to form different compounds. Examples include water (H<sub>2</sub>O) and table salt (NaCl). The smallest part of a compound is a molecule.</li><li>• A mixture is a combination of two or more substances that do not lose their identifying characteristics when combined. A solution is a mixture in which one substance dissolves in another.</li><li>• As its temperature increases, many kinds of matter change from a solid to a liquid to a gas. As its temperature decreases, that matter changes from a gas to a liquid to a solid.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• construct and interpret models of atoms, molecules, elements, and compounds.</li><li>• design an investigation to determine how heat affects the states of matter (of water). Include in the design how information will be recorded, what measures will be made, what instruments will be used, and how the data will be graphed.</li><li>• construct and interpret a sequence of models (diagrams) showing the activity of molecules in all three states of matter.</li><li>• compare and contrast: mixtures and solutions; elements and compounds; and atoms and molecules.</li></ul>

## **Grade Five Science Strand**

### **Living Systems**

The strand “Living Systems” begins in second grade and builds from basic to more complex understandings of a system, both at the ecosystem level and at the level of the cell. The concept of five kingdoms of organisms and a general classifying of organisms are also presented. The other major topics developed in the strand include the types of relationships among organisms in a food web, different types of environments and the organisms they support, and the relationship between organisms and nonliving environment. This strand includes science standards 2.5, 3.5, 3.6, 4.5, 5.5, and 6.9.



## **Strand: Living Systems**

### **Standard 5.5**

The student will investigate and understand that organisms are made of cells and have distinguishing characteristics. Key concepts include

- parts of a cell;
- five kingdoms of living things;
- vascular and nonvascular plants; and
- vertebrates and invertebrates.

### **Understanding the Standard**

This standard emphasizes the major categories of living things and builds on science standards 2.4 and 4.4. The use of a microscope (5.3) is applied to the study of plants, animals, and cells. It is intended that students will actively develop science investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.

## Standard 5.5

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Living things are made of cells. Cells carry out all life processes. New cells come from existing cells. Cells are too small to be seen with the eye alone. Using a microscope (5.3), many parts of a cell can be seen.</li><li>• Though plant and animal cells are similar, they are also different in shape and in some of their parts. Plant cells tend to be rectangular and animal cells spherical and at times irregular.</li><li>• Organisms that share similar characteristics can be organized into groups in order to help understand similarities and differences.</li><li>• Living things can be categorized into five kingdoms: monerans, protists, fungi, plants, and animals.</li><li>• Plants can be categorized as vascular (which have special tissues to transport food and water such as trees and flowering plants) and nonvascular (which do not have tissues to transport food and water such as moss). Most plants are vascular.</li><li>• Animals can be categorized as vertebrates (with backbones) or invertebrates (without backbones).</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• draw, label, and describe the essential parts of plant and animal cells. (For plants include the nucleus, cell wall, cell membrane, vacuole, chloroplasts, and cytoplasm. For animals include the nucleus, cell membrane, vacuole, and cytoplasm.)</li><li>• design an investigation to make observations of cells. Describe and demonstrate appropriate techniques of using a microscope including the proper placement of slide, and use of fine and coarse focus, and focusing on cells.</li><li>• compare and contrast plant and animal cells, and identify their major parts and functions.</li><li>• compare and contrast the distinguishing characteristics of the five kingdoms of organisms.</li><li>• group organisms into categories using their characteristics: living things (five kingdoms), plants (vascular and nonvascular plants), and animals (vertebrates or invertebrates). Name and describe two common examples of each group.</li></ul>

## **Grade Five Science Strand**

### **Interrelationships in Earth/Space Systems**

The strand focuses on student understanding of how Earth systems are connected, and how the Earth interacts with other members of the solar system. The topics developed include shadows; relationships between the sun and the Earth; weather types, patterns, and instruments; properties of soil; characteristics of the ocean environment; and organization of the solar system. This strand includes science standards K.7, 1.6, 2.6, 3.7, 4.6, 5.6, and 6.10.

## **Strand: Interrelationships in Earth/Space Systems**

### **Standard 5.6**

The student will investigate and understand characteristics of the ocean environment. Key concepts include

- geological characteristics (continental shelf, slope, rise);
- physical characteristics (depth, salinity, major currents);
- biological characteristics (ecosystems); and
- public policy decisions related to the ocean environment (assessment of marine organism populations, pollution prevention).

### **Understanding the Standard**

This standard extends the study of ecosystems to the ocean environment. It focuses on the major descriptive characteristics of oceans. Among the concepts are the geological characteristics of the ocean floor, the physical characteristics of ocean water, the ecological characteristics of communities of marine organisms, and public policy related to human impact on the ocean environment. Connections can be made to standards 5.2, 5.3, 5.4, 5.5, and 5.7. It is intended that students will actively develop science investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.

## Standard 5.6

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Oceans cover about 70% of the surface of the Earth.</li><li>• Important features of the ocean floor near the continents are the continental shelf, the continental slope, and the continental rise. These areas are covered with thick layers of sediments (sand, mud, rocks).</li><li>• The depth of the ocean varies. Ocean trenches are very deep, and the continental shelf is relatively shallow.</li><li>• Ocean water is a complex mixture of gases (air) and dissolved solids (salts, especially sodium chloride). Marine organisms are dependent on dissolved gases for survival. The salinity of ocean water varies in some places depending on rates of evaporation and runoff from nearby land.</li><li>• The basic motions of ocean water are the waves, ocean currents, and tides.</li><li>• Ocean currents, including the Gulf Stream, are caused by wind patterns and the differences in water densities (due to salinity and temperature</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• explain key terminology related to the ocean environment.</li><li>• create and interpret a model of the ocean floor, and label and describe each of the major features.</li><li>• research and describe the variation in depths associated with ocean features including the continental shelf, the abyssal plain, and ocean trenches.</li><li>• design an investigation (including models and simulations) related to physical characteristics of the ocean environment (depth, salinity, formation of waves and currents).</li><li>• interpret graphical data related to physical characteristics of ocean.</li><li>• explain the formation of ocean currents, and describe and locate the Gulf Stream.</li><li>• design an investigation (including models and simulations) related to biologic characteristics of the ocean environment (ecological relationships).</li></ul>

### Standard 5.6 (continued)

Overview	Essential Knowledge, Skills, and Processes
<p>differences). Ocean currents affect the mixing of ocean waters. This can affect plant and animal populations. Currents also affect navigation routes.</p> <ul style="list-style-type: none"><li>• As the depth of ocean water increases, the temperature decreases, the pressure increases, and the amount of light decreases. These factors influence the type of life forms that are present at a given depth.</li><li>• Plant-like plankton (phytoplankton) produce much of the Earth's oxygen and serve as the base of the ocean ecosystem. Plankton flourish in areas where nutrient-rich water upwells from the deep. Phytoplankton are eaten by animal-like plankton, swimming organisms, and those things that live on the ocean bottom.</li><li>• Humans impact the ocean environment through their everyday activities. Responsible public policy decisions are part of maintaining a healthy ocean environment. These decisions include improved monitoring of marine populations, placing bans on hunting or harming certain marine mammals, placing limits on catches of stressed populations, and greater emphasis on pollution prevention.</li></ul>	<ul style="list-style-type: none"><li>• interpret graphical data related to the biologic characteristics of ocean.</li><li>• analyze how the physical (depth, salinity, and temperature) characteristics of the ocean affect where marine organism can live.</li><li>• create and interpret a model of a basic marine food web including floating organisms (plankton), swimming organisms, and organisms living on the ocean bottom.</li><li>• describe ocean resources important to people including fisheries and mineral/petroleum resources, and explain what nations have done to conserve and protect these resources and the ocean environment.</li></ul>

## **Grade Five Science Strand**

### **Earth Patterns, Cycles, and Change**

The strand focuses on student understanding of patterns in nature, natural cycles, and changes that occur both quickly and over time. An important idea represented in this strand is the relationship among Earth cycles and change and their effects on living things. The topics developed include noting and measuring changes, weather and seasonal changes, the water cycle, cycles in the Earth-moon-sun system, and change in the Earth's surface over time. This strand includes science standards K.8, K.9, 1.7, 2.7, 3.8, 3.9, 4.7, and 5.7.

## **Strand: Earth Patterns, Cycles, and Change**

### **Standard 5.7**

The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include

- the rock cycle including the identification of rock types;
- Earth history and fossil evidence;
- the basic structure of the Earth's interior;
- plate tectonics (earthquakes and volcanoes);
- weathering and erosion; and
- human impact.

### **Understanding the Standard**

This standard focuses on the constantly changing nature of the Earth's surface and builds on concepts learned in standards 4.6 and 4.8. Among the important ideas presented in this standard are the rock cycle, fossil evidence of change over time, energy from within the Earth that drives tectonic plate movement, shifting tectonic plates that cause earthquakes and volcanoes, weathering and erosion, and human interaction with the Earth's surface. This standard can be related to several ideas found in science standard 5.6. It is intended that students will actively develop science investigation, reasoning, and logic skills (5.1) in the context of the key concepts presented in this standard.



## Standard 5.7

Overview	Essential Knowledge, Skills, and Processes
<p>The concepts developed in this standard include the following:</p> <ul style="list-style-type: none"><li>• Rocks move and change over time due to heat and pressure within the Earth and weathering and erosion at the surface. These and other processes constantly change rock from one type to another.</li><li>• Rocks have properties that can be observed, tested, and described. Composition, grain size and textural features, color, and the presence of fossils help with identification. Classification keys (5.1) can aid this process.</li><li>• Depending on how rocks are formed, they are classified as sedimentary (layers of sediment cemented together), igneous (melting and cooling, lava and magma), and metamorphic (changed by heat and pressure).</li><li>• Scientific evidence indicates the Earth is very ancient, approximately 4.5 billion years old. The age of many rocks can be determined very reliably. Fossils provide information about life and conditions of the past.</li></ul>	<p>In order to meet this standard, it is expected that students should be able to:</p> <ul style="list-style-type: none"><li>• apply basic terminology to explain how the Earth surface is constantly changing.</li><li>• draw and label the rock cycle and describe the major processes and rock types involved.</li><li>• compare and contrast the origin of igneous, sedimentary, and metamorphic rocks.</li><li>• identify rock samples (granite, gneiss, slate, limestone, shale, sandstone, and coal) using a rock classification key.</li><li>• make plausible inferences about changes in the Earth over time based on fossil evidence. This includes the presence of fossils of organisms in sedimentary rocks of Virginia (the Appalachians, Piedmont, and Coastal Plain/Tidewater).</li><li>• describe the structure of Earth in terms of its major layers (crust, mantle, and inner and outer cores) and how the Earth's interior affects the surface.</li></ul>

### Standard 5.7 (continued)

Overview	Essential Knowledge, Skills, and Processes
<ul style="list-style-type: none"><li>Scientific evidence indicates that the Earth is composed of four concentric layers, each with its own distinct characteristics. The outer two layers are composed primarily of rocky material; the innermost layers are composed mostly of iron and nickel. Pressure and temperature increase with depth beneath the surface.</li><li>The Earth's heat energy causes movement of material within the Earth. Large continent-sized blocks, (plates) move slowly about the Earth's surface, driven by that heat.</li><li>Most earthquakes and volcanoes are located at the boundary of the plates (faults). Plates can move together (convergent boundaries), apart (divergent boundaries), or slip past each other horizontally (sliding boundaries, also called strike-slip or transform boundaries).</li><li>Geological features in the oceans (including trenches and mid-ocean ridges) and on the continents (mountain ranges, including the Appalachian Mountains) are caused by current and past plate movements.</li></ul>	<ul style="list-style-type: none"><li>differentiate among the three types of plate tectonic boundaries (divergent, convergent, and sliding boundaries) and how these relate to the changing surface of the Earth and the ocean floor (5.6).</li><li>compare and contrast the origin of earthquakes and volcanoes and how they affect the Earth's surface.</li><li>design an investigation to locate, chart, and report weathering and erosion at home and on the school grounds. Create a plan to solve erosion problems that may be found.</li><li>differentiate between weathering and erosion.</li><li>design an investigation to determine the amount and kinds of weathered rock material found in soil.</li><li>describe how people change the Earth's surface and how negative changes can be controlled.</li></ul>

**Standard 5.7 (continued)**

Overview	Essential Knowledge, Skills, and Processes
<ul style="list-style-type: none"><li>• Rocks and other materials on the Earth’s surface are constantly being broken down both chemically and physically. The products of weathering include clay, sand, rock fragments, and soluble substances. Weathered rock material can be moved by water and wind and deposited as sediment.</li><li>• Humans have varying degrees of impact on the Earth’s surface through their everyday activities. With careful planning, the impact on the land can be controlled.</li></ul>	